

In the Matter of: )  
The Preparation of the ) Docket 04-IEP  
*2005 Integrated Energy Policy* )  
*Report (2005 Energy Report)* )

**There Is No Electricity Crisis In California The Water  
Agencies Can't Solve - Or Make Worse  
ACWA Workshop Comments on Water - Energy Relationship  
Staff Draft Paper**

Lon W. House, Ph.D.  
530.676.8956 - [www.waterandenergyconsulting.com](http://www.waterandenergyconsulting.com)

Docket 04-IEP-1H

June 21, 2005  
Sacramento, CA

# Summary

- Water agencies are single largest electricity end users in California ~3,200 MW maximum demand
  - Water agencies already curtail approximately 400 MW of on-peak demand
- Water agency solutions to California electricity problems
  - Additional peak demand curtailment - +250 MW from existing systems, +1,000 MW with more storage, +250 MW with TOU water meters/rates
  - Water agency generation
    - 500+ MW of standby generators available
    - Hydro - 1,631 MW existing, +255 MW new small
    - Biogas - 38 MW, 36 MW new potential
    - Natural gas engines - existing ~100 MW, 200 MW additional potential
    - Solar - 5 MW, +100MW potential
- Water agencies potential for increased demand + ~3,575 MW (next 10 years)
  - Existing conjunctive use in drought/dry years ~350MW
  - Proposed conjunctive use development/drought ~ +1,350 MW
  - Desalinization ~250 MW salt water plus 250 MW desalting groundwater = +500 MW
  - Electrification of ag diesel pumps = +350 MW
  - Increased treatment requirements = +160 MW
  - Increased water marketing - +230 MW
  - Increased recycled water use - +685 MW

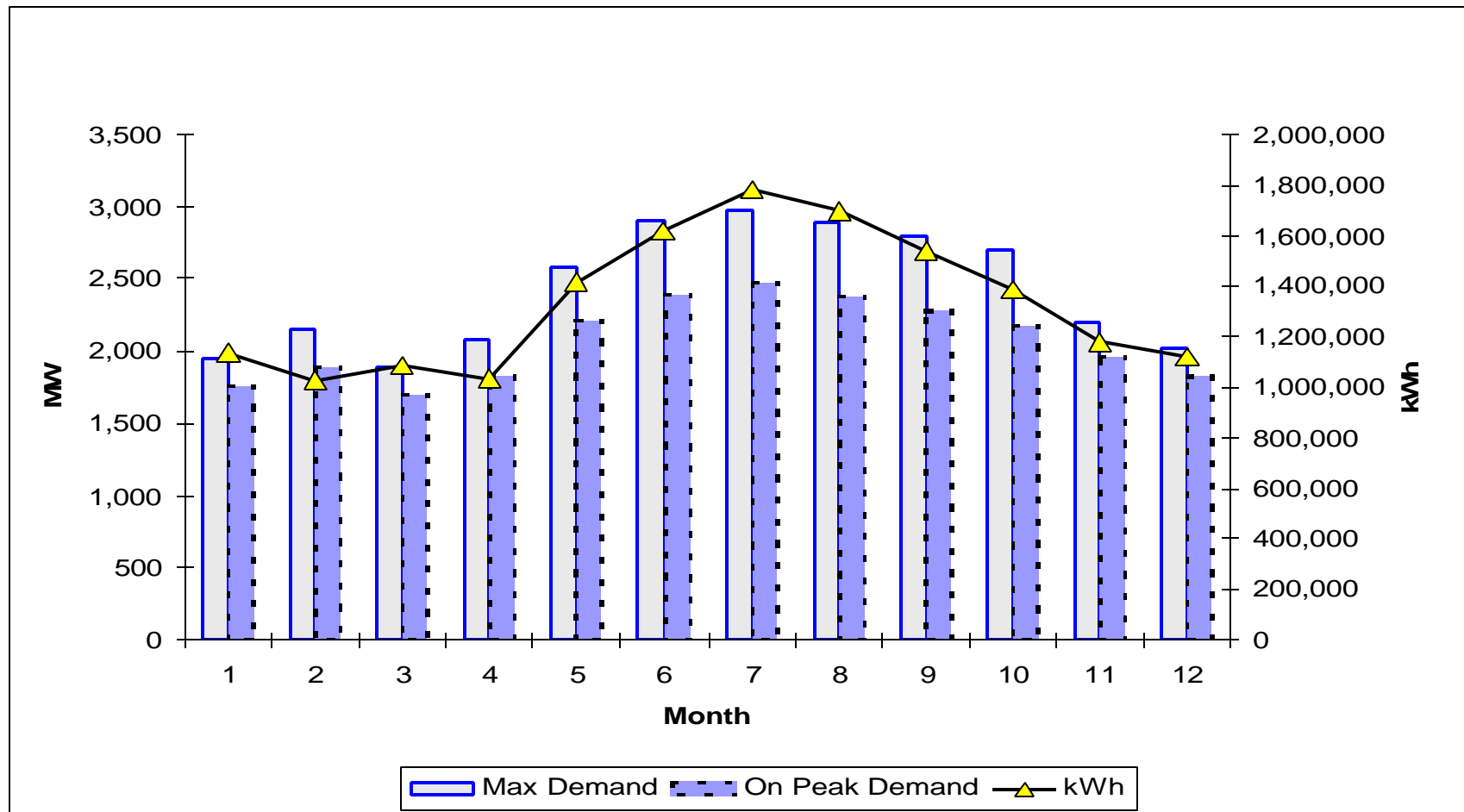
# Comments Outline

- Summary
- Water agency demand
  - peak and energy
  - current on-peak curtailment
  - potential on-peak curtailment
- Water agency generation current and potential
  - back-up, natural gas, hydro, microturbines, solar
- Potential increased water agency demand
  - conjunctive use, desalinization and desalting, new regulations, water marketing, population increases, recycled water use
- Policy recommendations
  - data needs
  - policy recommendations

# Water Agency Demand Characteristics

- ~3,200 MW maximum demand
  - ~2,800 MW summer on-peak demand
    - water agencies currently shift approximately 400 MW out of the summer on peak period, primarily due to TOU rates (using storage and natural gas engines)
- Minimum load ~900 MW
- Annual load factor ~0.62
- Seasonal - summer maximum demand is 33 percent higher than winter max; summer energy use is ~60 percent of annual use
- Increased peak demand reduction
  - Water agencies have estimated potential to shift additional 250 MW out of peak with current configurations
  - Have potential to shift 1,000 MW+ out of peak with more storage
  - Have potential to shift another 250+ MW with TOU water meter/rates

# California Water Agency Electricity Requirements



# Necessary Items To Get More Water Agency Peak Demand Curtailment

- Technical assessment (T/A) moneys/program need to be released (\$50/kW audit)
  - Still do not have utility T/A in place for this summer - have to prove to water agency that they can shift pumping and still meet delivery and performance requirements before they'll shift load
- Technical incentives (T/I) moneys/program need to be released (\$100/kW hardware/software installation)
  - Still do not have utility T/I in place for this summer
- Incentives for investments in water non traditional energy savings measures need to be approved
  - Storage, nitrification sensors, control valves, flow sensors, SCADA

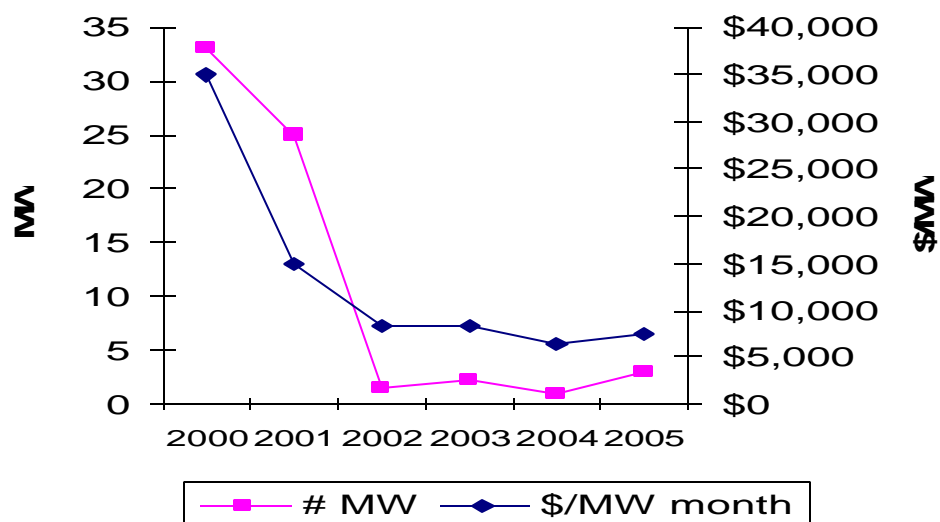
# Water Agency Peak Reduction Mechanisms

- More aggressive use of existing system - primarily pump scheduling and storage use
  - Requires system simulations to assure operators that system won't be compromised via new operations
    - Continuing problems with utility payment for technical assistance
  - Requires additional staffing and additional sensors and controls
    - Current payment levels inadequate
    - Utility rebates for sensors/controls issue
- Add or accelerate additional storage
  - Need some stability in tariffs/demand response programs
  - No financial incentives for storage additions
- Peaking generation
  - Solar - new ACWA Solar Preferred Partner Program
  - Hydroelectric generation - reversible pump/turbines
  - Natural gas engines
- Get water customers to shift water use out of peak period
  - TOU water meters and tariffs development/case study

# Water Agencies Demand Response Is Very Price Responsive

year	# MW	# water agencies	/MW month
2000	33	29	\$35,000
2001	25	25	\$15,000
2002	1.5	2	\$8,250
2003	2.4	4	\$8,250
2004	0.9	2	\$6,375
2005	3	13	\$7,500

**Water Agency Peak Demand  
Response Program Participation  
Over The Years**





# Characteristics of a Desirable Demand Response Program

- A multi-year program
  - *so water agencies can have some investment recovery period*
- A demand payment for participation in the program
  - *to cover necessary capital investment costs*
- Payment of a fixed risk premium
  - *water customers won't be impressed if their district saved the state if they run out of water, pressure, fire protection, or are required to boil water*
- A per-event payment
  - *to cover additional staffing requirements, component wear and tear, and replacement water costs*
- Has a reasonable verification criteria
  - *10 day rolling average doesn't work - needs to be adjusted for load reduction from previous hour*
- Accurate and timely settlements
  - *hassles with payments, or waiting months, cools ardor for the program*
- Adequate curtailment notification
  - *in time to prepare and staff up for curtailment event*

# Water Agency Back-Up Generation

- Over 10% (>500 MW) of all back-up generation in the state is owned by water agencies
  - *Over 200 MW in the South Coast Air Basin alone*
- Back-up generation is diesel - due to requirements for on-site fuel storage
- Operating permits prevent water agencies use of back-up generation to prevent blackouts - can only use them after blackout has occurred
- The use of back-up generation to prevent an outage will result in less pollution than having a blackout
  - Back-up generators will be running while traffic in a gridlock due to lights out

# CEC Back-Up Generation Database

- BUGS database suspect
- Example
  - Ventura County APCD lists 60 MW of back-up generation
    - No entry or mention of Calleguas MWD generation - 8.7 MW installed - permits for almost another 1 MW
    - 15% off with only one water agency included

# Water Agency Hydro Generation

CA Water Agency Hydro Generation		
Existing		
<u>size</u>	<u>#</u>	<u>MW</u>
< 1 MW	42	20
1-10MW	54	215
10-100MW	25	790
> 100 MW	<u>3</u>	<u>606</u>
	<b>124</b>	<b>1631</b>
Potential New		<b>255</b>

# Other Water Agency Generation

- Biogas
  - Existing 22 facilities totaling 38 MW
  - Potential new 200 potential facilities
    - 36 MW
- Natural Gas Engines
  - ~100 MW equivalent in use
  - ~200 MW equivalent potential
- Solar
  - Existing ~5 MW
  - Potential unknown, estimated at 100 MW

# Generation Issues

- New Generation
  - Most small hydro - conduit location, peaking generation.
- Interconnection requirements
  - FERC May 12th order standardizing interconnection requirements for generators under 20 MW is a great step forward
- Price of generation
  - Water agencies would like to serve own load as opposed to selling into the wholesale market
    - Allow aggregation of accounts for net metering generation like allowed for demand response programs
- Cost of scheduling
  - \$6,000-\$8,000 per month for schedule coordinators
    - ACWA working with Sempra Energy Solutions to try a develop a master schedule coordinator agreement to be shared

# California Water Agency Summary

- Current maximum demand ~3,200 MW
- On-peak demand reductions
  - Current - 400 MW
  - Additional after analysis - +250 MW
  - Available with additional storage ~ +1,000 MW
  - Available from customer TOU response ~ +250 MW
- Generation
  - Existing back up - 500 MW
  - Existing natural gas engines - 100 MW +200 MW
  - Existing hydro - 1631 MW +255 MW
  - Existing biogas - 38 MW +36 MW
  - Solar ~5 MW + estimated 100 MW

# Water Agency Demand Increases

- Potential increased demand ~3,575 MW (next 10 years)
  - Existing conjunctive use in drought/dry years ~350 MW
  - Proposed conjunctive use development/drought ~ +1,350 MW
  - Desalinization ~250 MW salt water plus 250 MW desalting groundwater = +500 MW
  - Electrification of ag diesel pumps = +350 MW
  - Increased treatment requirements = +160 MW
  - Increased water marketing = +230 MW
  - Increased recycled water use = +685 MW
- Unknown demand increasers
  - Drought/climate change - unknown
  - Increased population impacts - unknown



# Time-Of-Use Water Rates Opportunity

- All water in California, if it is metered, is volumetric, no time differentiation
- If water agencies can get customers to shift water consumption out of on-peak period, it will reduce agency on-peak pumping/treatment requirements
- Issues:
  - Time of use water meters
  - Time of use water tariffs
  - Meter reading and billing
  - Likely customer response
  - Cost of implementation
- Proposal for demonstration case at the CEC

# Policy Recommendations

- **Peak Demand Reduction**

- This summer
  - Free up technical assistance money so we can complete studies prior to summer
  - Allow financial incentives to be used for adding water agency storage and sensors and controls
- Longer term
  - Rate design and program stability
  - Demand response program modifications - including duration and financial incentives
  - Allow financial incentives to be used for adding water agency storage and sensors and controls
  - Additional generation
    - Solar as backup
    - Peaking hydro
  - Development and case studies in customer TOU water rates
    - TOU water meter development
    - TOU water tariffs
    - Peak shift response of water customer

- **Generation**

- **General** - allow aggregation of water agency meters to qualify for net metering, similar to what is happening with demand response programs
- **Solar** - increase available pool of rebate money to allow additional water agencies to install solar, increase contracting timeframe after reservation notification to account for longer public agency decision making time

- **Demand Response Programs**

- **A multi-year program** - so water agencies can have some investment recovery period
- **A demand payment for participation in the program** - to cover necessary capital investment costs
- **Payment of a fixed risk premium** - water customers won't be impressed if their district saved the state if they run out of water, pressure, fire protection, or are required to boil water
- **A per-event payment** - to cover additional staffing requirements, component wear and tear, and replacement water costs
- **Has a reasonable verification criteria** - 10 day rolling average doesn't work - needs to be adjusted for load reduction from previous hour
- **Accurate and timely settlements** - hassles with payments, or waiting months, cools ardor for the program
- **Adequate curtailment notification** - in time to prepare and staff up for curtailment event

- **Utility Incentives**

- ***Water agency specific technologies*** - such as increased storage, water parameter sensors, and controls - should be eligible for utility demand reduction incentives

- **Conservation Credits**

- Water saving measures that also save energy - should be given credits for both

- **Water Agency Generation**

- Backup should be able to be used prior to blackouts to avoid them
  - On site generation delivered to the system should net with other usage (other sites)

- **Water Customer Demand Response Needs To Be Investigated**

- Time of Use water meters need to be developed and demonstrated and Time of Use water tariffs need to be developed, implemented, and their effectiveness in shifting demand analyzed

- **Energy Impacts -**

- ***New Regs*** - Energy impacts and costs of new and existing water regulations should be specifically addressed
  - ***New Development*** - Energy impact and costs of supplying water for new development needs to be considered
  - ***New Supply*** - Energy requirements and costs of new/additional water supplies need to be addressed